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IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Stock Market Prediction using Machine Learning

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Abstract: In the finance world, stock trading is the most important task. Predicting how stock market prices will vary is one of the most difficult things to do. Many factors play an important role in affecting the stock prices. Many models have been developed to predict values with minimal error rate. Stock market prediction is the process of determining, future stock value of a firm. Successful prediction could yield significant profit. In our system we have implemented technical analysis, visualization, and prediction using data provided by Yahoo Finance. By looking at data from the stock market, particularly some giant technology stocks and others, we will try to predict the future stock prices.

Index Terms: Machine Learning, Regression, KNN (K-Nearest Neighbors), NASDAQ (National Association of Securities Dealers Automated Quotations)

I. INTRODUCTION

The Primary source for a company to raise funds for expansion is the Stock Market. The concept is based on demand and supply. If the demand for a firm's stock is higher, then the share price increases and vice versa. Understanding the insights and the power to make efficient decisions has scaled us up to a level where we can get answers within a fraction of a second. Considering the risk involved in trading and the volatility is influenced by a number of factor and predicting the behaviour of a company's stocks has been an area of interest for several Data Analyst from a long time now.

Different algorithms have been designed by using different techniques but have failed to provide an accurate prediction. In our project, we propose to build a system that will work on a bunch of similar comparison models and will predict the stock prices by mapping it to its past behaviour under similar potential conditions. This project will focus solely on predicting the daily trend (price movement) of individual stocks. The system will make no attempt to deciding how much money investor should allocate to each prediction. The system will analyse the accuracies of these predictions. The hope is that with a greater understanding of how the market moves, investors will be better equipped to prevent financial crisis.

II. PROBLEM STATEMENT

"Stock Market Prediction using ML" is the project on technical analysis, visualization, and prediction using data provided by Yahoo Finance. To Analyse & Predict Stock (Shares) changes from trained data using Machine Learning Algorithms.

III. LITERATURE SURVEY

In the last few decades forecasting of stock returns has become an important field of research. In most of the cases the researchers had attempted to establish a linear

Relationship between the input macroeconomic variables and the stock returns [1]. After the discovery of non-linearity in the stock market index returns, many literatures have come up in nonlinear statistical modelling of the stock returns.

Authors of [2] has described that linear regression may be a noteworthy technique. The way linear regression models work is that they're often fitted using the least squares approach, but they will be fitted in other ways also, like by diminishing the" lack of fit" in another norm, or by diminishing a handicapped version of the least square's loss function. Conversely, the least squares approach are often utilized to suit nonlinear models.

Professor Eugene F. Fama[3] of the University of Chicago performed extensive research on stock price patterns. In 1966, he developed the Efficient Markets Hypothesis, which asserts that current securities prices reflect all available information and expectations. This framework has several implications for investors. If current market prices offer the simplest available estimate of real value, stock mispricing should be considered a rare condition that can't be systematically exploited through fundamental research or market timing. Moreover, only unanticipated future events will trigger price changes, which is one reason for the apparent short-term "randomness" of returns. Authors of [4] has implemented the proposed model in which they have divided the dataset into two parts, training set and testing set. The training set is employed to coach the info and study the share qualities while the testing set is employed for prediction. Within the training set, we calculate absolute value of change during a share price over the interval for each day and take the mean of it.

Moreover, the analysis can also be done by sentimental analyse. Social media networks plays a huge impact due to its increased usage, and it can [5] be helpful in predicting the trend of the stock market. According to authors of [6] recent improvements in stock prediction falls under four categories—statistical, pattern recognition, machine learning (ML), and sentiment analysis. They have also stated that there techniques which combines the broader categories to predict the stock markets. Hence, we have selected some of the specified algorithms.

Authors of [7] has proposed an efficient system for stock market prediction overcome various challenges. They have considered the prediction time as a primary factor along with accuracy, confidence and generalization of the stock market prediction.

IV. PROPOSED SYSTEM

There are many applications available related to stock market information on internet but there is hardly any application available for prediction purpose. Our approach for predicting stock market will be great contribution in the world wide web. We will be providing a web application where user will request a webpage by visiting a web server which will serve client functionalities. Such functionalities will help the client to view current status, visualized graphics related to stock prices and a recommended suggestion about the future stock prices. Using this, the client will get useful insights to invest his money into a company's stock prices. Our web application will include a client area which will be divided into two sections, one for visualization and other for analysis. Even a noob client will be able to use the web applications interface. There will be input and output section using which will allow the user to interact with the application. It may also have a discussion panel if feasible so that the users can communicate within themselves. One of the most important objectives is to evaluate its accuracy, acceptability in terms of security and reliability. For which we are using multiple machine learning algorithms.

V. SYSTEM ARCHITECTURE

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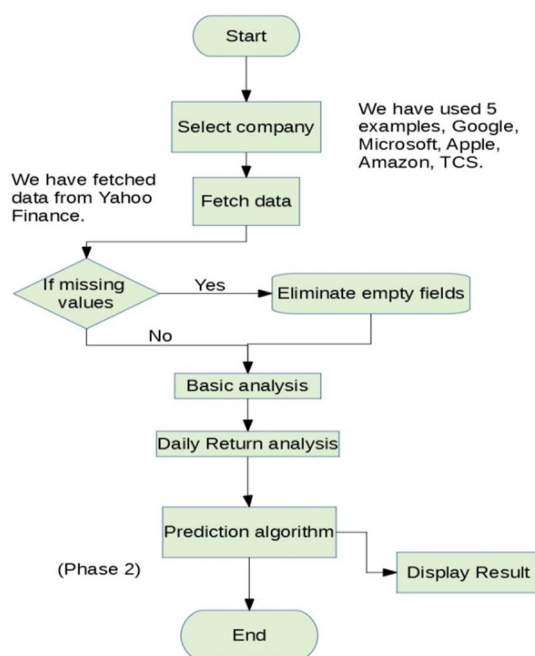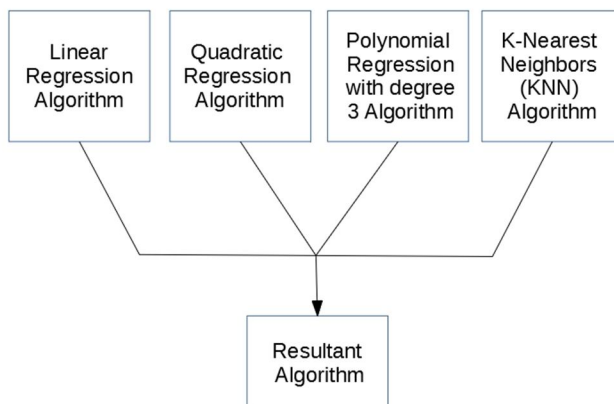
VI. ALGORITHM

Algorithm is the core of the system. It is motivated by the observation that on many practical problems, algorithms have different performances. For our system, we have used a bunch of algorithms which includes:

A. Linear Regression Algorithm
B. Quadratic Regression Algorithm
C. Polynomial Regression with degree 3Algorithm
D. K-Nearest Neighbors (KNN) Algorithm.

The prediction is the resultant of combination of these various algorithms.

VII. ALGORITHM VALIDATION

We checked our algorithm's accuracy on multiple companies' historical stock data. Our results show visualized graphs of predicted prices against actual stock prices. Our algorithms were successful at finding out the patterns. KNN did exhibit spikey behaviour. The Linear Regression showed a lazy approasch and didn't adapt to change very easily. KNN showed the highest volatility followed by Polynomial Regression with degree 3. Our combined method had the advantage of KNN with high volatility and was also less prone to false values because we had combined multiple regression algorithms of varying orders.
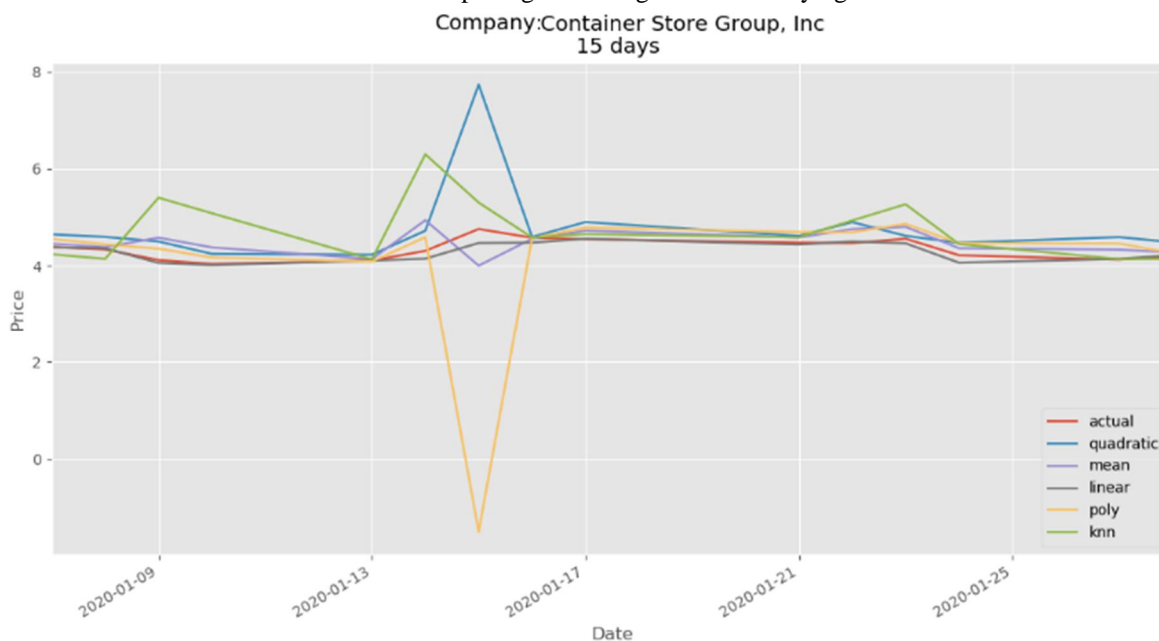
VIII. CONCLUSION

Thus, as we can see above in our proposed method. We have fetched the stock market data from Yahoo Finance. Different parameters like 'High, 'Low, 'Open', 'Volume' & 'Adj. Close' are fetched. We made sure that data is not null and stored it in the form of datasets using pandas. Then we took a closer look at the daily changes of each stock, and not just its absolute value. The different algorithms we have implemented achieves a better resultant algorithm. As Investor always prefer stock which gives small increment on daily basis with good stability.

Thus, as we can see above in our proposed method, we fetched the data from Yahoo Finance dataset that is available. We used this data to analyze and predict the stock price.

IX. ACKNOWLEDGMENT
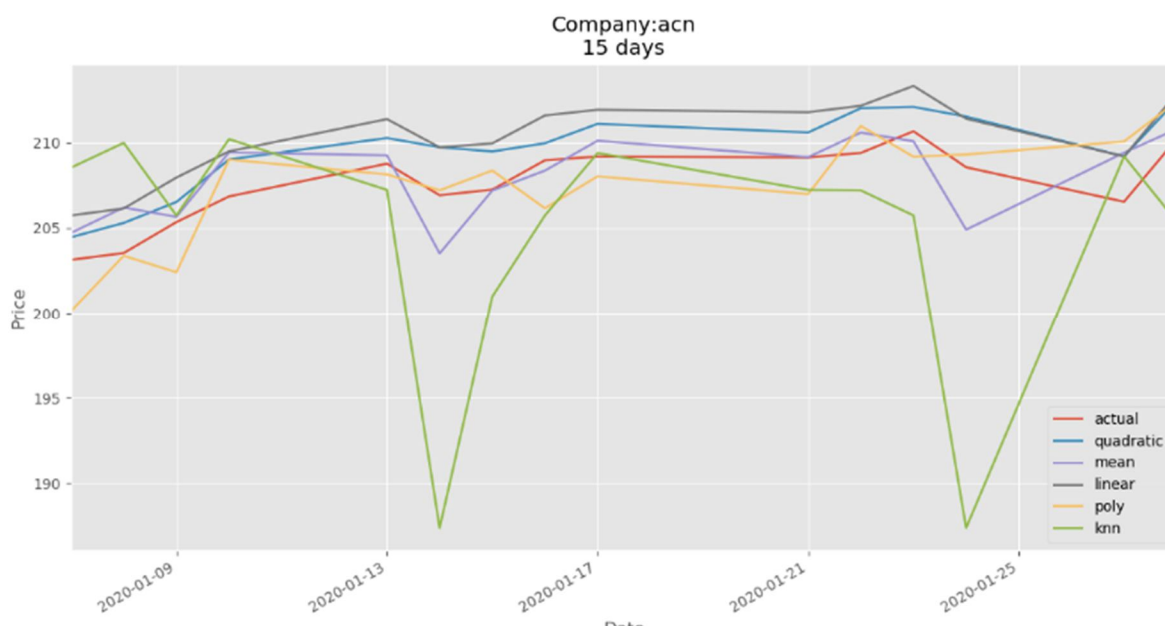
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